

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

IN THE MATTER OF APPROVING A)
NONRADIOACTIVE AIR EMISSIONS NOTICE)
OF CONSTRUCTION FOR INSTALLATION)
AND OPERATION OF A WASTE RETRIEVAL)
SYSTEM IN DOUBLE-SHELL TANKS FOR)
THE DEPARTMENT OF ENERGY)
OFFICE OF RIVER PROTECTION)

NOC APPROVAL ORDER
NUMBER: DE00NWP-001R1

To: Mr. Roy J. Schepens, Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

RECEIVED
FEB 17 2005

EDMC

FINDINGS:

On May 17, 2000, the United States Department of Energy, Office of River Protection (USDOE-ORP), submitted a Notice of Construction (NOC) application for installation and operation of a waste retrieval system in double-shell tanks (DSTs), located in the Hanford Site 200 Areas. On December 13, 2004, the USDOE-ORP submitted a non-substantial modification to their NOC application relating to mixer pump details associated with DSTs 241-AY-101 and 241-AY-102.

In relation to the above, the Washington State Department of Ecology (Ecology), pursuant to Revised Code of Washington (RCW) 70.94.152, Washington Administrative Code (WAC) Chapters 173-400 and 173-460, makes the following determinations:

1. The proposed project, if constructed and operated as herein required, will be in accordance with applicable rules and regulations, as set forth in WAC Chapters 173-400 and 173-460, and the operation thereof, at the location proposed, will not result in ambient air quality standards being exceeded.
2. The proposed project, if constructed and operated as herein required, will provide all known, available, and reasonable, methods of emission control.

1. LAWS AND REGULATIONS

All proposed activities performed in support of installation and operation of a waste retrieval system in DSTs by the USDOE-ORP, referred to herein as the Permittee, shall comply with all requirements as specified in:

- RCW Chapter 70.94, Washington Clean Air Act;
- WAC Chapter 173-400, General Regulations for Air Pollution Sources;
- WAC Chapter 173-460, Controls for New Sources of Toxic Air Pollutants.

2. EMISSIONS

- A. All emissions from the construction activities are expected to be fugitive emissions. Volatile Organic Compound (VOC) emissions and Toxic Air Pollutants (TAPs), are not expected to be released during the construction activities.

The construction activities potentially could increase the rate of fine particulate matter (PM-10), and particulate matter (PM). An estimated total of 8,220 cubic yards of soil will be excavated over the eleven (11) year period of these activities. The estimated emissions from the total 8,220 cubic yards of soil is 0.05 ton of PM, and 0.21 ton of PM-10.

- B. New emissions are expected from the package boilers when placed in service. The estimated emissions are reflective of three (3) boilers operating at the same time, for a maximum of 720 hours per year per boiler.

C. Pollutant	D. Estimated boiler E. emissions
NOx (oxides of Nitrogen)	1.94 tons/year
CO (Carbon Monoxide)	0.77 tons/year
VOCs (volatile organic compound)	0.33 tons/year
PM-10 (fine particulate matter)	0.28 tons/year
SOx (oxides of Sulfur)	0.70 tons/year
Nitric Oxide	1.94 tons/year

- C. Increased emissions of TAPs (ammonia) at the source tank during mixing, and at the receiver tank during a waste transfer, are expected from the affected tank farm stacks, during normal operations of the waste retrieval systems. It is anticipated that the most significant emissions will occur during startup, and a short period thereafter. Once equilibrium is reached in the headspace, it is anticipated that concentrations will level off.
- D. There are no directly applicable sample data from DSTs, or waste retrieval operations, that can be used to calculate potential emissions. Therefore, sampling data and flame ionization detector (FID) readings obtained during the 1999 sluicing operations at the 241-C-106 tank, and the resultant emissions predictions (00-OSS-086), with the exception of ammonia, will be used to represent emissions from these waste retrieval operations. Sluicing is a more aggressive process than waste retrieval and, therefore, has been used to provide a conservative estimate of potential emissions.

Ammonia was modeled separately because ammonia is generated through radiolysis regardless of the ventilation flow rate in the tank headspace, and once mixing begins, previously generated, but trapped ammonia, will be made available for release. The highest liquid waste ammonia concentration from the affected tanks listed in the NOC was used in the Schumpe Model to estimate headspace concentrations at the receiving tank during a waste transfer (RPP-4941; HNF-SD-WM-CN-118). The Class A and B constituents, headspace concentrations, and estimated emissions are shown in Table 2 of the NOC.

3. **BACT** -- WAC 173-400-113 requires the use of Best Available Control Technology (BACT) to control emissions. Since emissions will be below the threshold levels contained in WAC 173-400-110(5)(d), no additional technology controls are warranted.
4. **T-BACT** -- WAC 173-460-040(4)(b) requires the use of Best Available Control Technology for Toxics (T-BACT) to control toxic emissions. Since all emissions resulting from the proposed operations are in compliance with the WAC 173-460 acceptable source impact levels (ASILs), no additional controls are warranted.

ADDITIONAL FINDINGS

The proposed project consists of the installation and operation of one (1) waste retrieval system (mixer pumps and other associated equipment), in the 241-AP-102, 241-AP-104, 241-AN-101, 241-AN-102, 241-AN-103, 241-AN-104, 241-AN-105, 241-AN-107, 241-AW-101, 241-AW-103, 241-AW-104, 241-AY-101, 241-AY-102, 241-AZ-101, 241-AZ-102, 241-SY-101, 241-SY-102, and 241-SY-103 DSTs. Generally, this includes removal of existing equipment, installation of new equipment, and construction of new ancillary equipment and buildings. The pumps will operate in a batch mode, as needed, to provide waste feed for immobilization into a solidified waste product (i.e., glass logs). The waste capacity of the tanks will not be altered, nor will the ventilation or emissions control systems. Further, resultant emissions of all toxic air pollutants (TAPs), except ammonia, will be below the associated small quantity emission rate (SQER). Ammonia will be below its SQER, but above its twenty-four (24) hour SQER. Installation of a waste retrieval system in these DSTs is scheduled to take place between the years 2000 and 2011.

1. PROCESS DESCRIPTION

The upgrades at each tank farm will include the following major components.

A. New In-Tank Equipment

New in-tank equipment will be the following:

- Installation of one (1) or two (2) mixer pumps in each tank for mobilizing the settled solids. Each pump will be capable of mixing waste at approximately 10,400 gallons per minute.

- Installation of a high-pressure spray wash system to be used for future decontamination of the mixer pumps, as the pumps are removed from the tank.
- Installation of one (1) pump in each tank for the transfer of waste. The pumps will be capable of maintaining a variable waste transfer at a rate of up to 140 gallons per minute.
- Installation of one (1) closed circuit television system per tank as required.

B. New Ancillary Equipment and Buildings

New ancillary equipment and buildings will be as follows:

- Construction of a new instrument building, an annex to an existing instrument building, or modifications to an existing instrument building, as needed to house retrieval instrumentation/electrical equipment and operator stations.
- Installation of electrical power and instrument cables, and other utility tie-ins and/or upgrades (e.g., sanitary and raw water, and telecommunications).
- Construction of up to three (3) caustic supply/dilution systems. The caustic supply systems will be used to bring waste properties into compliance with the feed specifications, and to flush and preheat transfer lines. Each system will be capable of providing approximately 140 gallons per minute of pH-adjusted water. Each system will consist of a package boiler, a chemical injection pump, a diluent/flush pump, a diluent/flush tank (approximately 5,000 gallons), and a spill containment pad for caustic delivery trucks. Each boiler is rated at 250-boiler horsepower (8.369 million British Thermal Units [BTUs] per hour), and is 82 percent efficient.
- The boilers will run on No. 2 diesel oil, not to exceed 0.05 percent Sulfur by weight.
- Installation of new process jumpers inside pump pits, installation of a new valve pit, and new pump pit cover blocks as required.
- Installation of new piping: double-contained waste transfer piping, and water and diluent piping, to and from the process pits.

C. Removal, Relocation, Replacement, Decontamination, and Demolition of Existing Equipment

- The existing flexible receiver equipment will be used to remove and decontaminate, to acceptable levels, the long-length waste contacting pieces of equipment. The remaining equipment will be removed using the general bag-out process (sleeving equipment with plastic or piping as removed). Various in-tank equipment, such as the following, will be removed from the tanks to make room for the waste retrieval

equipment, or will be replaced with equivalent equipment built to withstand the mixer pump jet forces:

- ✓ Removal of existing mixer pumps and air-lift circulators as needed
- ✓ Removal of transfer pumps, slurry distributors, drop-leg jumpers, thermocouple probes, and multi-function instrument trees as required
- ✓ Removal and replacement of existing jumpers and cover blocks from pump and valve pits
- ✓ Relocation of closed-circuit television cameras to different risers as needed
- ✓ Replacement of temperature probes as required

D. Waste Staging and Retrieval Process Overview

- The retrieval process will transfer waste from a source tank to a receiving tank, or from a source tank to a waste treatment facility, as feed stock. Mixing and dilution of the waste could take place at the source tanks to meet transfer line specifications, i.e., solids content must be within a predetermined amount. Waste at the receiving tanks also could be conditioned and/or diluted, to deliver compliant waste to a waste treatment facility. Incoming waste will be staged in a tank until enough waste has been accumulated to transfer, and the treatment facility is ready to receive, a batch. The mixer pump will be operated to maintain waste uniformity during staging and to mix the waste for a short period before being transferred.
- Mixer pump operation will be in batches of up to 450 hours per year per tank. The mixer pump will be operated at full speed until waste samples verify that adequate mixing has been achieved. If dilution or conditioning is needed, the pH and temperature of the diluent will be adjusted by means of a caustic supply system. Once the waste is verified acceptable, the transfer lines will be preheated, flushed with diluent, and a waste transfer to a receiving tank, or to a treatment facility will begin. After the transfer, the lines will be flushed with diluent.

2. VENTILATION AND EMISSIONS CONTROL SYSTEMS

The tank farms ventilation and control systems are designed to maintain a negative pressure, remove process and radiolytic heat, and remove water vapor and particles, for each primary vapor space. No changes will be made to the existing ventilation, or emissions control systems currently in place at the affected tank farms, because these systems have been determined adequate to remove additional heat generated by the mixer pumps. A thermal evaluation showed that the operation of one (1) 300 horsepower mixer pump would result in slow, controlled, and easily observable, increases in waste temperature without compromising the tank operating limits. The maximum expected temperature increase at the tank, due to operation of a mixer pump, is approximately 2.3°F per day (WHC-SD-W211-

ER-002). The cumulative effect at the filtration system, however, is negligible, because the exhaust streams, from the tanks with mixer pumps, are diluted when mixed with the air streams from the other tanks in the tank farm before entering the filtration system.

The AN, AP, and AW Tank Farms ventilation and control systems are very similar. A description is provided as follows with the differences for the AY/AZ and SY systems noted as applicable.

Inlet air is provided through tank dome penetrations via gaps in the pit cover blocks of the tanks (AP Tank Farm), or through inlet air risers equipped with a prefilter and a single stage high-efficiency particulate air (HEPA) filter (AN, AW, and AY/AZ Tank Farms). Air is exhausted from each tank independently to a common header that continues on to a central exhaust station. The exhaust station consists of two (2) filtration subsystems and the stack. Either subsystem can collectively ventilate all the tanks together. Only one (1) subsystem operates at a time, while the other remains in standby as a backup. The SY exhaust station consists of one (1) filtration system and a stack. A portable exhauster is stationed on location and used as the backup.

- Each filtration subsystem for the AN, AP, and AW exhaust stations consists of a de-entrainer, for the removal of moisture; a heater that is operated intermittently as needed for lowering the relative humidity; a pre-filter for reducing the number of large particles; two (2) stages of HEPA filters; and an exhaust fan. The AY/AZ filtration system consists of a condenser; a high-efficiency mist eliminator (HEME); and two (2) parallel filter trains consisting of a heater that operates intermittently, one (1) stage HEPA filter, one (1) stage high-efficiency gas absorber (HEGA), one (1) stage HEPA filter and a fan, with both trains exhausting to the stack.
- The portable exhauster at the SY Tank Farm consists of a de-entrainer, heater (declared non-functional and removed from service), prefilter, two (2) stages of HEPA filters, an exhaust fan, and the stack. Annually, the HEPAs in all the systems are tested individually (per ASME N510), to a minimum efficiency of 99.95 percent for the removal of particulates with a median diameter of 0.3 micron.

Toxic constituent concentrations are in compliance with their respective acceptable source impact levels (ASIL) at the respective points of emission, as opposed to the Hanford Site boundary. Therefore, no changes to the current controls are required.

THEREFORE, IT IS ORDERED that the project as described in said Notice of Construction application, and more specifically detailed in plans, specifications, and other information, submitted to the Washington State Department of Ecology in reference thereto, is approved for construction, installation, and operation, provided the following conditions are met:

APPROVAL CONDITIONS

1. TOTAL EMISSION LIMITS

- A. The activities described in the Notice of Construction application will be permitted without additional control technologies required, provided that the total emissions from all activities will not result in exceedance of WAC 173-460 ASILs.
- B. Operation of the proposed boilers shall not exceed 720 hours per year per boiler, and be in accordance with good combustion practices (GCP) to minimize emissions, based on the manufacturer's recommendations, and require the use of fuel with a Sulfur content of 0.05% or less. Periodic preventive maintenance and combustion adjustments shall be made, as necessary, to maintain GCP, but at least annually. Per Ecology's request, the USDOE shall demonstrate the effectiveness of GCP to Ecology during normal operation of the boilers.
- C. A new Notice of Construction will be required, if total emissions of toxic air pollutants exceed the Small Quantity Emission Rates, unless dispersion modeling demonstrates that emissions would continue to result in concentrations less than the ASILs. Results of any such dispersion modeling demonstrations/calculations will be maintained on file at the tank farms and made available upon inspection.
- D. A new NOC also is required if total emissions of criteria pollutants would exceed the WAC 173-400-110 thresholds.

2. GENERAL REQUIREMENTS

- A. Notification will be made ten (10) days prior to initiating waste retrieval operations covered by this Order.
- B. An updated schedule of installation and operation activities will be made available upon request.

3. EMISSION CONTROL MONITORS

- A. No sampling is required for nonradioactive air emissions because all contaminant emissions are below their respective small quantity emission rates (SQERs), with the possible exception of ammonia. Estimated ammonia emissions were calculated to be above the twenty-four (24) hour SQER, but below the annual SQER and the acceptable source impact level (ASIL).
- B. However, organic vapor analyzers (OVAs), or other similar instruments for detecting fugitive organic emissions, as part of Hanford's Industrial Hygiene program to monitor worker exposure, will be used to monitor for VOCs.

- C. The data obtained in the course of monitoring worker exposure will be used by the Permittee as an administrative control measure to verify that VOC emissions do not exceed 500 parts per million (PPM). The 500 PPM level will be used as an indicator to facilitate field monitoring of potential VOC emissions, using existing Industrial Hygiene equipment.

4. MANUALS

Operations and Maintenance (O&M) manuals for all equipment associated with the proposed activities that have the potential to affect emissions to the atmosphere shall be developed and followed. Manufacturers' instructions may be referenced. The O&M manuals shall be updated to reflect any modifications of the process or operating procedures. Emissions that result from failure to follow the requirements of the O&M Manuals or manufacturers' instructions may be considered proof that the equipment was not properly operated, maintained, and tested. Copies of the O&M Manuals shall be available to Ecology upon request.

5. NOTIFICATIONS AND SUBMITTALS

All notifications and submittals required under these Approval Conditions shall be sent to:

Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354

6. MONITORING AND RECORDKEEPING

Specific records shall be kept on-site by the Permittee and made available for inspection by Ecology upon request. The records shall be organized in a readily accessible manner and cover a minimum of the most recent sixty (60) month period. The records to be kept shall include the following:

- A. Work Package activities related to site occupational health sampling/monitoring.
- B. Evaluations of additions or changes to demonstrate compliance with the ASIL limits (for additions or changes not otherwise exempt under WAC 173-400 or -460).
- C. Boiler logs, including operating time, preventive maintenance and combustion adjustments to maintain GCP, and certification that boiler fuel contains less than 0.05% Sulfur, will be maintained on file at the tank farms and made available to Ecology upon request.

7. ASIL EVALUATION

The methodology used in evaluating emissions to demonstrate potential total emissions are below the ASILs as described in Section 7.0 of the NOC application may be modified with Ecology's concurrence.

8. GENERAL CONDITIONS

- A. **Visible Emissions:** No visible emissions shall be allowed beyond the property line.
- B. **Commencing/Discontinuing Construction and/or Operations:** This approval shall become void if the proposed activities are not commenced within eighteen (18) months after receipt of this Order approving the NOC application, or if activities are discontinued for a period of eighteen (18) months.
- C. **Compliance Assurance Access:** Access to the source by the United States Environmental Protection Agency (EPA) or Ecology shall be allowed for the purposes of compliance assurance inspections. Failure to allow access is grounds for revocation of the Order approving the NOC.
- D. **Modification to Facility or Operating Procedures:** Any modification to any equipment or operating procedures, contrary to information in the NOC application, shall be reported to Ecology at least sixty (60) days before such modification. Such modification may require a new, or amended, NOC approval Order.
- E. **Activities Inconsistent with this Order:** Any activity undertaken by the Permittee or others, in a manner that is inconsistent with the NOC application, and this determination, shall be subject to Ecology enforcement under applicable regulations.
- F. **Obligations under Other Laws or Regulations:** Nothing in this Order shall be construed to relieve the Permittee of its obligations under any local, state, or federal laws, or regulations.

Nothing in this approval shall be construed as obviating compliance with any requirement of law other than those imposed pursuant to the Washington Clean Air Act, and rules and regulations thereunder.

A two (2) month testing and break-in period is allowed, after any part or portion of this project becomes operational, to make any changes or adjustments required to comply with applicable rules and regulations pertaining to air quality and conditions of operation imposed herein. Thereafter, any violation of such rules and regulations, or of the terms of this approval, shall be subject to the sanctions provided in Chapter 70.94 RCW.

Authorization may be modified, suspended, or revoked in whole, or part, for cause including, but not limited to, the following:

1. Violation of any terms or conditions of this authorization;
2. Obtaining this authorization by misrepresentation, or failure to disclose fully all relevant facts.

The provisions of this authorization are severable and, if any provision of this authorization, or application of any provisions of this authorization to any circumstance, is held invalid, the application of such provision to their circumstances, and the remainder of this authorization, shall not be affected thereby.

Any person aggrieved by this ORDER may obtain review thereof by application, within thirty (30) days of receipt of this ORDER, to:

Pollution Control Hearings Board
P.O. Box 40903
Olympia, Washington 98504-0903

Concurrently, copies of the application must be sent to:

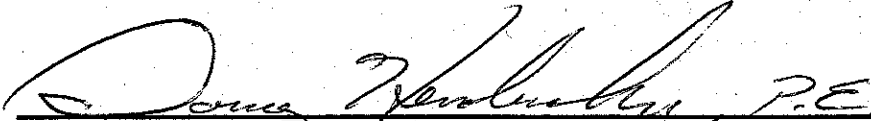
Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

These procedures are consistent with the provisions of Chapter 43.21B RCW, and the rules and regulations adopted thereunder.


DATED at Richland, Washington, this 15th day of February 2005.

PREPARED AND REVIEWED BY:



Douglas Hendrickson

APPROVED BY:



Michael A. Wilson